Clean Harbors Kansas, LLC
Analytical Procedures

Clean Harbors Kansas, LLC
Analytical Procedures

August 14, 1998
Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 11

EXTRACTION FOR SOLIDS

1.0 SCOPE AND APPLICATION

1.1 This method is used in the screening of waste samples for high levels of organic halides. This method is primarily used to screen solvents, although some semi-volatiles (bp> 200° C) will be detected. Heavier PCBs do not extract well with polar solvents.

1.2 Methanol is the current solvent and yields good (>90%) matrix spike recoveries. Other solvents can be used provided they yield adequate spike recoveries.

2.0 METHOD SUMMARY

A nominal 1 gram sample of waste is extracted with methanol using physical agitation.

3.0 INTERFERENCES

The TOX analyzer is relatively interference free.

4.0 SAFETY PRECAUTIONS

Waste samples can contain extreme levels of hazardous compounds. The analyst should be acquainted with the waste stream and take precautions consummate with the potential risk.

5.0 APPARATUS AND EQUIPMENT

5.1 25 ml Septum capped vial, or equivalent.

5.2 Sample Agitator (optional).

6.0 REAGENTS

Methanol, interference free, or equivalent.

7.0 SAMPLE HANDLING AND PRESERVATION

7.1 Samples should be extracted in a timely manner. No holding time exists for samples of this type. No preservative is required.

7.2 It is recommended that extracts not to be analyzed within 7 days be stored at 4°C±2°C. Extracts should not be stored more than 30 days.

8.0 CALIBRATION AND STANDARDIZATION

For details of instrument calibration, see the applicable parts of the QA Plan (Instrument Calibration).

9.0 PROCEDURE

9.1 Obtain the tare weight of a 25 ml vial.

NOTE: All weights in this method are to be recorded to the nearest 0.01 grams, unless otherwise noted.

9.2 Add a nominal 1 gram of sample and record the gross weight.

9.3 Add 10 ml of methanol to the sample and agitate for 1 minute.

10.0 SAMPLE CALCULATIONS

Quantity of TOX is expressed as mg/kg TOX (as chloride).

Sample concentration is:

$$\text{mg/kg TOX} = \frac{(\text{ug TOX}) \times (\text{ml Extract}) \times 1000}{(\text{ul injected}) \times (\text{gm sample})}$$

11.0 QUALITY CONTROL

11.1 Method Blank - A method blank should be analyzed at a minimum frequency of 10% or 1 per extraction batch.

11.2 Matrix Spike/Matrix Spike Duplicate (MS/MSD) - an MS/MSD will be run at a minimum frequency of 10%.

11.2 2,4,6-Trichlorophenol will be used as the spiking compound. A solution independent of the calibration standard will be used.

12.0 METHOD PERFORMANCE

12.1 Method spike recoveries should be between 75% - 125%.

12.2 Method duplicate precision should be <30% RPD.

13.0 REFERENCES

Waste dilution, Method 3580, SW-846

Sonification extraction, Method 3550, SW-846

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 21

RADIANT HEAT IGNITION TEST PROCEDURE

(IGNITABLE SOLIDS SCREEN)

Revision No.13
September 03,2010

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 21

RADIANT HEAT IGNITION TEST PROCEDURE

(IGNITABLE SOLIDS SCREEN)

1.0 SUMMARY OF METHOD

A sample is placed 6 cm beneath a preheated radiant heat source and the time to ignition is detected by a thermocouple sensor and recorded on a strip chart recorder.

2.0 APPARATUS AND REAGENTS

2.1 Test chamber - as shown in Figure 1.

2.2 Sample container - aluminum weighing pan, 6 cm diameter x 1.7 cm deep.

2.3 Controller/sensor - as shown in figure 1.

2.4 Recorder - strip chart, variable speed and input impedance.

2.5 Safety Equipment

2.5.1 Flameproof gloves (Lab Safety Supply 1915M or equivalent)

2.5.2 Tongs - 53 cm (Fisher, 15-207 or equivalent)

2.5.3 Respirator (Fisher, 13-995-11 or equivalent)

2.6 Balance (minimum accuracy to nearest 100 mg)

3.0 TEST PROCEDURE

3.1 Locate the test chamber in a fireproof fume hood with the exhaust fan turned on.

3.2 If the hood is large enough, locate the controller/sensor and the recorder outside the hood but in proximity to the test chamber.

3.3 With an empty sample container on the sample platform to provide a heating element (Figure 1: part no. 1) to sample container (top rim) distance of 6 cm.

3.4 Position the thermocouple (Figure 1; part no 7) 1 cm above the top rim and centered over the sample container.

3.5 Connect the thermocouple to position 33 (Figure 1) on the controller/sensor using the cable supplied.

3.6 Connect the heater/solenoid cable (Figure 1: part no. 16, 17) to position 34 (Figure 1) on the controller/sensor.

3.7 Connect the power cord on the controller/sensor to a 110 VAC power source.

3.8 Set the variable transformer to 0.

3.9 Position a dummy sample container (blackened with carbon soot) directly under heat source. Close the chamber door.

3.10 Turn on the controller/sensor.

3.11 Turn on the heater. Set the variable transformer to the setting determined during the temperature adjustment procedure.

3.12 Preheat the radiant heat source for 30 minutes.

3.13 Transfer sample to the sample container to a depth of approximately 1 cm, making sure that the sample surface is level and smoothed.

WARNING!!

Extreme care must be exercised in testing materials known or suspected of being highly flammable. Preliminary test using greatly diminished sample sizes should be conducted prior to performing the actual test to insure the safety of the analyst. A reduced test sample depth should be used in cases where sample ignition is extremely rapid and/or violent.

3.14 Place the filled sample container outside, but in proximity to, the test chamber.

3.15 Start the recorder at a chart speed of 0.5 in/min and a full-scale sensitivity of 1 volt.

3.16 Open the side door and remove the dummy sample container.

3.17 Using tongs and flameproof gloves, pick up the filled sample container and place it onto the metal trough. With the tongs, slide the sample container under the radiant heat source. Immediately, close the side door and activate the recorder zero knob to mark the chart.

CAUTION!!

The placement of the sample beneath the radiant heat source, the marking of the recorder chart and the closing of the chamber door must be executed as quickly as possible to optimize the precision of the test results.

3.18 Raise the chamber door and remove the ignited sample from beneath the radiant heat source and carefully place it in the bottom of the chamber.

WARNING!!

Raise the fume hood and test chamber doors just to a level that facilitates removal of the sample form beneath the radiant heat source. Flameproof gloves should be used in combination with tongs to protect the analyst from the burning sample.

3.19 Extinguish the fire by smothering.

3.20 Prepare the chamber for the next sample by positioning the dummy sample container beneath the radiant heat source.

3.21 Lower the fume hood door to one-half the height of the chamber.

3.22 Measure the distance (cm) from the initial mark to ignition on the recorder. Calculate the time to ignition from the calibrated recorder speed.

3.23 Proceed with the analysis of subsequent samples by repeating steps 3.13 through 3.22

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 25

COMPATIBILITY EVALUATIONS

Revision No.13
September 03,2010

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 25

COMPATIBILITY EVALUATIONS

Compatibility Evaluations:

Two evaluation procedures are discussed below, the first dealing with determination of waste to waste compatibility, and the second with waste to container or tank materials of construction compatibility.

Waste to Waste Compatibility Evaluation:

The determination of whether, or not, two wastes are compatible may involve up to three levels of evaluation. The first level will rely on a review of the results of previous compatibility determinations for the wastes under evaluation. If a compatibility determination cannot be made from a review of previous evaluations, a second level of evaluation will be employed.

This second level will involve a review of analytical data on file for the wastes under evaluation and a search of appropriate literature and/or the use of "Compatibility Charts" to assess the potential for the waste streams to be compatible. Sources of information would include 40 CFR 264, Appendix V, Example of Potentially Incompatible Wastes; or "A Method For Determining The Compatibility of Hazardous Wastes", EPA- 600/2-80-076, April 1980. If a determination about compatibility cannot be made after reviewing the procedures above, a third level of evaluation will be employed.

The third level of evaluation will require that a laboratory test procedure be performed, in which samples of the wastes are mixed and observed for signs of adverse reaction. The Technical Manager will not be required to perform all three levels of evaluation, but may opt to begin the evaluation at level two or at level three. If a determination is made that wastes are incompatible, the wastes will be segregated during storage at Clean Harbors Kansas, LLC If the laboratory test procedure indicates that the waste streams are compatible, then these waste streams may be mixed during storage regardless of the results of the determinations made at level one or level two.

Waste to Waste Compatibility Testing Procedure

General Safety Precautions:
At a minimum, laboratory personnel will wear safety glasses, gloves, protective clothing, and protective footwear while performing the tests for waste compatibility. The tests will be perfomed under a lab fume hood. Laboratory personnel will check the manifest and other shipping documents to be familiar with the wastes and ensure that all necessary precautions are taken.

Detailed Procedure:

- Place a clean beaker in a fume hood.
- Add 100 - 150 ml of a representative sample of waste stream "A" (one of the wastes to be mixed or which may come into contact during storage).
- Add 100 - 150 ml of a representative sample of waste stream "B" (the other wastes to be mixed or which may come into contact during storage) to the same beaker.
- Check for these typical signs of reactivity:
  - gas generation (method: visual inspection)
  - temperature change (method: thermometer)
  - violent reactions (method: visual or audible inspection)
  - fire/explosion (method: visual or audible inspection)
- If a reaction exhibiting one or more of the above characteristics occurs, the waste streams will be deemed incompatible and will not be stored together or mixed together in a tank or container.

Waste to Tank or Container Compatibility Evaluation:

The evaluation of whether, or not, a waste is compatible with the tank or container into which it is desired to place the waste is based on determining the potential of the waste to corrode the materials of construction of the tank or container. As many of the tanks at Clean Harbors Kansas, LLC are of carbon steel construction, the evaluation focuses on the potential of wastes to corrode carbon steel.

Prior to storing a waste in a tank or in a container fabricated of carbon steel, the waste will be checked for compatibility with carbon steel. A pH analysis and Table WC.1 will be used to determine the compatibility of the waste sample.

If the pH is determined to be less than or equal to 2.0 or equal to or greater than 12.5, (<=2.0, pH, =>12.5) and thus exhibits the regulatory characteristic of corrosivity, then the waste will not be stored in direct contact with carbon steel.

If the pH of the waste is determined to be greater than 2.0 and less than 12.5 (2.0 < pH < 12.5), then a review of the Waste Profile Sheet for the presence of any compounds listed in Table WC.1 will be performed. Table WC.1 was developed by LES after reviewing published sources and compiling a list of compounds (with corresponding concentrations) that corrode carbon steel at a rate greater than 0.05 inches per year at temperatures from 0° to 130° F. It should be noted that this rate of corrosion is only 20% of the rate at which a waste would meet the characteristic of corrosivity.

If the Waste Profile Sheet indicates that the concentration of a compound exceeds the level indicated in Table WC.1, the waste will not be treated or stored in carbon steel tanks (uncoated) or stored in a container made of carbon steel (unlined). Such a waste may be placed in a fiberglass reinforced plastic tank or a container furnished with a corrosion resistant lining.

Compatibility sources utilized include The Chemical Engineer's Handbook, Perry and Chilton, 5th ed., pg. 23-16 to 23-34, 1973; Engineering Materials Handbook, Mantell, 38-1 to 38-19, 1958.

Table WC.1
Compatibility of Waste with Carbon Steel[1]

Compound	Concentration (volume %) - (C)	Temperature Range (deg F) - T
acetic acid	5 < C < 100	T > 60
chromic acid	5 < C < 20	T > 60
citric acid	10 < C < 40	T > 60
formic acid	C > 25	T > 60
hydrochloric acid	C > 5	T > 60
hydrofluoric acid	10 < C < 60	T > 60
nitric acid	C > 5	T > 60
oxalic acid	7 < C < 13	T > 60
phosphoric acid	C > 5	T > 60
sulfuric acid	10 < C < 90	T > 60
aluminum chloride	10 < C < 90	T > 60
aluminum potassium sulfate	7 < C < 13	T > 60
ammonium chloride	20 < C < 30	T > 60
aniline	100	T > 60
calcium hypochlorite	100	T > 60
copper sulfate	5 < C < 100	T > 60
fatty acids	100	T > 60
ferric chloride	10 < C < 45	T > 60
ferrous chloride	10 < C < 25	T > 60
ferrous sulfate	7 < C < 13	T > 60
hydrogen peroxide	15 < C < 50	T > 60
nickel sulfate	10 < C < 100	T > 60
potassium hydroxide	35 < C < 50	T > 100
sodium chloride	100	T > 100
soduim hydroxide	45 < C < 75	T > 100
zinc chloride	10 < C < 65	T > 50
zinc sulfate	10 < C < 35	T > 50

NOTE: Compounds listed above are corrosive to carbon steel at a rate greater than 0.05 inches per year at the given concentrations and temperatures. Many of the concentrations given do not fall within the pH constraints set for the compatibility of the waste with the carbon steel tanks. Therefore, consideration for compliance with the above table for waste streams that do not fall within the pH requirements set will not be required.

Clean Harbors Kansas, LLC **ANALYTICAL PROCEDURE 1**

EXPLOSIVITY SCREEN

Revision No. 13
September 03,2010

Clean Harbors Kansas, LLC **ANALYTICAL PROCEDURE 1**

EXPLOSIVITY SCREEN

1.0 SCOPE AND APPLICATION

An organic vapor analyzer is used to determine the concentration of organic vapors in air. For the purpose of this method, the air in question will be the headspace above liquid or solid waste samples.

2.0 SUMMARY OF METHOD

2.1 A portable gas detection unit is used to determine concentrations of oxygen (as % O_2) or combustible gases (as ppm or % LEL) in the atmosphere. Sample vapors are drawn across a combustible gas detector (Wheatstone bridge), through the pump, to flow across an oxygen detector and vent to the outside. Readings obtained are displayed on either an analog meter dial or a digital display.

3.0 INTERFERENCES

3.1 Humidity can effect the reading obtained in the low ppm range.

3.2 Certain substances, particularly silicone vapors, act as "catalyst poisons" and can result in decreased sensitivity.

3.3 Chlorinated vapors will give a catalytic response although they are not truly flammable.

3.4 Since acetylene is very active catalytically it may tend to give a reaction at the reference element, thereby nullifying the signal from the active element.

3.5 When sampling spaces which are warmer than the instrument, water vapor can condense in the sample line, blocking the flame arrestor and interfering with pump operation.

4.0 SAFETY

4.1 The electric circuitry of the unit is certified to be intrinsically safe and can be safely used in testing any mixture of combustible gas in air.

4.2 Safety glasses, lab coat, and chemically resistant gloves should be worn while handling laboratory samples.

5.0 APPARATUS AND EQUIPMENT

5.1 GasTechtor model #1314 Hydrocarbon Super Surveyor equipped with a 10 inch probe and hose sample inlet system, or equivalent.

5.2 Calibration gas with known ppm levels of a hydrocarbon.

6.0 SAMPLE HANDLING AND PRESERVATION

Keep samples tightly capped and analyze as soon as possible to prevent the escape of vapors.

7.0 CALIBRATION AND STANDARDIZATION

7.1 Press the power switch to turn the instrument on. Press the battery check button and note the meter reading. The reading must be above the BATT CK mark on the meter for use. If not, the meter must be recharged.

7.2 Setting the LEL span.

7.2.1 Expose the sample probe tip to a known calibration gas.

7.2.2 Locate the LEL SPAN potentiometer on the underside of the circuit board inside the unit, along one edge, near the front.

7.2.3 Watch the combustibles display carefully, and adjust the reading to the desired value by turning the potentiometer. Turn the potentiometer clockwise to increase the reading.

7.2.4 Remove the calibration gas and allow the reading to return to zero. If the reading does not return to zero repeat the above steps until the correct reading is obtained.

7.2.5 If reading cannot be set high enough, replace the detector.

7.3 Setting the Oxygen zero.

7.3.1 Expose the sample probe tip to a known oxygen-free sample, such as nitrogen, argon, or helium.

7.3.2 Locate the ZERO potentiometer, along the front edge of the circuit board.

7.3.3 Watch the display carefully, and, if necessary, adjust the reading to zero by turning the ZERO potentiometer.

7.3.4 If zero adjustment cannot be made, have the oxygen cell reactivated.

7.4 There is no separate field adjustment needed for the PPM span. The relationship between LEL and PPM sensitivity is precalculated and set at the factory.

8.0 PROCEDURE

8.1 Turn the instrument on and allow to warm up in ambient air. The unit may be used when warm up is complete (usually about 2 minutes), but full stabilization of the readings may take up to 20 minutes.

8.2 Laboratory readings are reported in ppm, therefore make sure that the LEL/PPM button is in the PPM position.

8.3 Unscrew the lid of the sample jar and tilt it only enough to allow the probe to enter the headspace over the sample. Read and record the highest reading shown on the meter.

9.0 QUALITY CONTROL

9.1 Calibration should be verified daily using a gas with known ppm levels of a hydrocarbon to ensure accuracy of results.

9.2 Replicate readings should be taken on samples at a frequency of at least 20% to ensure precision of results.

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Analytical Procedures

Clean Harbors Kansas, LLC ANALYT~~I~~CAL PROCEDURE 2

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HOC SCREEN

Revision No.13
September 03,2010

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 2

HOC SCREEN

1.0 SCOPE AND APPLICATION

The Bielstein test provides an easy and reliable screen for detecting the presence of organic halogens in a sample. The test does not differentiate between chlorine, bromine, and iodine. Fluorine does not produce a positive result.

2.0 SUMMARY OF METHOD

When an organic halogen is heated with copper oxide the result is the production of a volatile copper halide which imparts a blue-green color to the flame. Two methods are given here, one for volatile compounds and one for non-volatile compounds, differing only in the way that the sample is introduced into the flame.

3.0 INTERFERENCES

3.1 Very volatile liquids may evaporate before the test is complete.

3.2 Several non-halogenated compounds have been stated to also cause a green flame, such as organic acids, copper cyanide, urea, quinoline, and pyridine derivatives.

4.0 SAFETY

4.1 Since this method utilizes an open flame, caution must be used around flammable solvents and materials.

4.2 Safety glasses, lab coat, and chemically resistant gloves should be worn while handling laboratory samples.

5.0 APPARATUS AND EQUIPMENT

5.1 Propane refrigerant sniffer (Freon leak detector).

5.2 For non-volatile compounds, a 20 gauge wire with a small loop in the end.

6.0 SAMPLE HANDLING AND PRESERVATION

All samples should be kept in containers with a tight, leakproof cap.

7.0 PROCEDURE

7.1 Volatile compounds.

7.1.1 Ignite the leak detector and allow the copper disk inside the burner to become red hot.

7.1.2 Unscrew the lid of the sample jar and place the aspirator tube into the headspace above the sample. If halogen is present, the flame will burn green to blue-green.

7.1.3 Highly volatile hydrocarbons which are not halogenated may cause the flame to burn more vigorously and bright yellow in color. This should not be confused with a positive result.

7.2 Non-volatile compounds.

7.2.1 Ignite the leak detector. Hold the looped end of the copper in the flame and burn off any residue. Cool the wire.

7.2.2 Unscrew the lid of the sample jar and dip the wire into the sample. Immediately plunge the wire into the flame. After the sample burns, note the color change in the flame. If halogen is present, the flame will have a green color.

8.0 QUALITY CONTROL

Test daily with a one percent solution of trichloroethylene in methanol. A positive test should be seen for either method.

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 3

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IGNITABILITY OF SOLIDS

Pevision No. 13
September 03,2010

Clean Harbors Kansas, LLC ANALYTICAL PROCEDURE 3

IGNITABILITY OF SOLIDS

1.0 SCOPE AND APPLICATION

This method is used to determine the susceptibility of a solid or semi-solid waste to ignition by a spark source or open flame.

2.0 SUMMARY OF METHOD

Sparks from a flint lighter or an open flame are introduced to the headspace above a sample of solid waste, and observation is made for either a flash in the vapor space or ignition of the sample.

3.0 SAFETY

3.1 Since this method utilizes an open flame, caution must be used around flammable solvents and materials.

3.2 Safety glasses, lab coat, and chemically resistant gloves should be worn while handling laboratory samples.

4.0 APPARATUS AND EQUIPMENT

4.1 Flint lighter, wooden or paper matches, or other source for sparks or flame.

4.2 A 300 mL beaker, or a similar container of adequate size to accomodate the sample with vapor space.

4.3 A watch glass of adequate size to cover the mouth of the beaker.

4.4 A timer or stop watch.

5.0 SAMPLE HANDLING AND PRESERVATION

All samples should be kept in containers with a tight, leakproof cap.

6.0 PROCEDURE

6.1 Place approximately 100 mL of well-mixed sample into the beaker and cover with the watch glass.

6.2 Allow to stand closed for about five minutes.

6.3 Tilt the watch glass and carefully place the ignition source directly in the vapor space above the sample in the beaker. A flash in the vapor space or ignition of the sample itself indicates a positive test.

7.0 QUALITY CONTROL

The simple positive/negative nature of this screen does not lend itself to typical QA/QC measures. Suspect results should be repeated or verified by other methods.

Clean Harbors Kansas, LLC
RCRA Permit Application
Section C - Waste Characterization
Appendix C-A - Waste Analysis Plan
Attachment C-D - Sampling

Attachment C-D

Excerpts from "Samplers and Sampling Procedures for Hazardous Waste Streams"

Revision No. 10
May 19, 2008

Attachment C-D

Excerpts from "Samplers and Sampling Procedures for Hazardous Waste Streams"

SECTION 4

SAMPLERS

Sampling of hazardous wastes requires different types of samplers. Some of these samplers are commercially available, but the others have to be fabricated. This section lists and describes suitable samplers. Their uses and commercial availability as well as directions for their use are reported. Directions for fabricating the commercially unavailable samplers are also outlined.

COMPOSITE LIQUID WASTE SAMPLER (COLIWASA)

The Coliwasa is the single most important hazardous waste sampler discussed in this report. It was chosen from a number of other liquid samplers, based on laboratory and field tests, as the most practical. It permits the representative sampling of multiphase wastes of a wide range of viscosity, corrosivity, volatility, and solids content. Its simple design makes it easy to use and allow the rapid collection of samples, thus minimizing the exposure of the sample collector to potential hazards from the wastes. The sampler is not commercially available, but it is relatively easy and inexpensive to fabricate. The cost of fabrication is low enough that the contaminated parts may be discarded after a single use when they cannot be easily cleaned.

The recommended model of the Coliwasa is shown in Figure 1. The history and development of this sampler is discussed in detail in Appendix A. The main parts of the Coliwasa consist of the sampling tube, the closure-locking mechanism, and the closure system.

The sampling tube consists of a 1.52-m(5-ft.) by 4.13-cm(1 5/8-in.) I.D. translucent plastic pipe, usually polyvinyl chloride (PVC) or borosilicate glass plumbing tube. The closure-locking mechanism consists of a short-length, channeled aluminum bar attached to the sampler's stopper rod by an adjustable swivel. The aluminum bar serves both as a T-handle and lock for the sampler's closure system. When the sampler is in the open position, the handle is place in the T-position and pushed down against the locking block. This manipulation pushes out the neoprene stopper and opens the sampling tube. In the close position, the handle is rotated until one leg of the T is squarely perpendicular against the locking block. This tightly seats the neoprene stopper against the bottom opening of the sampling tube and positively locks the sampler in the close position. The closure tension can be adjusted by shortening or lengthening the stopper rod by screwing it in or out

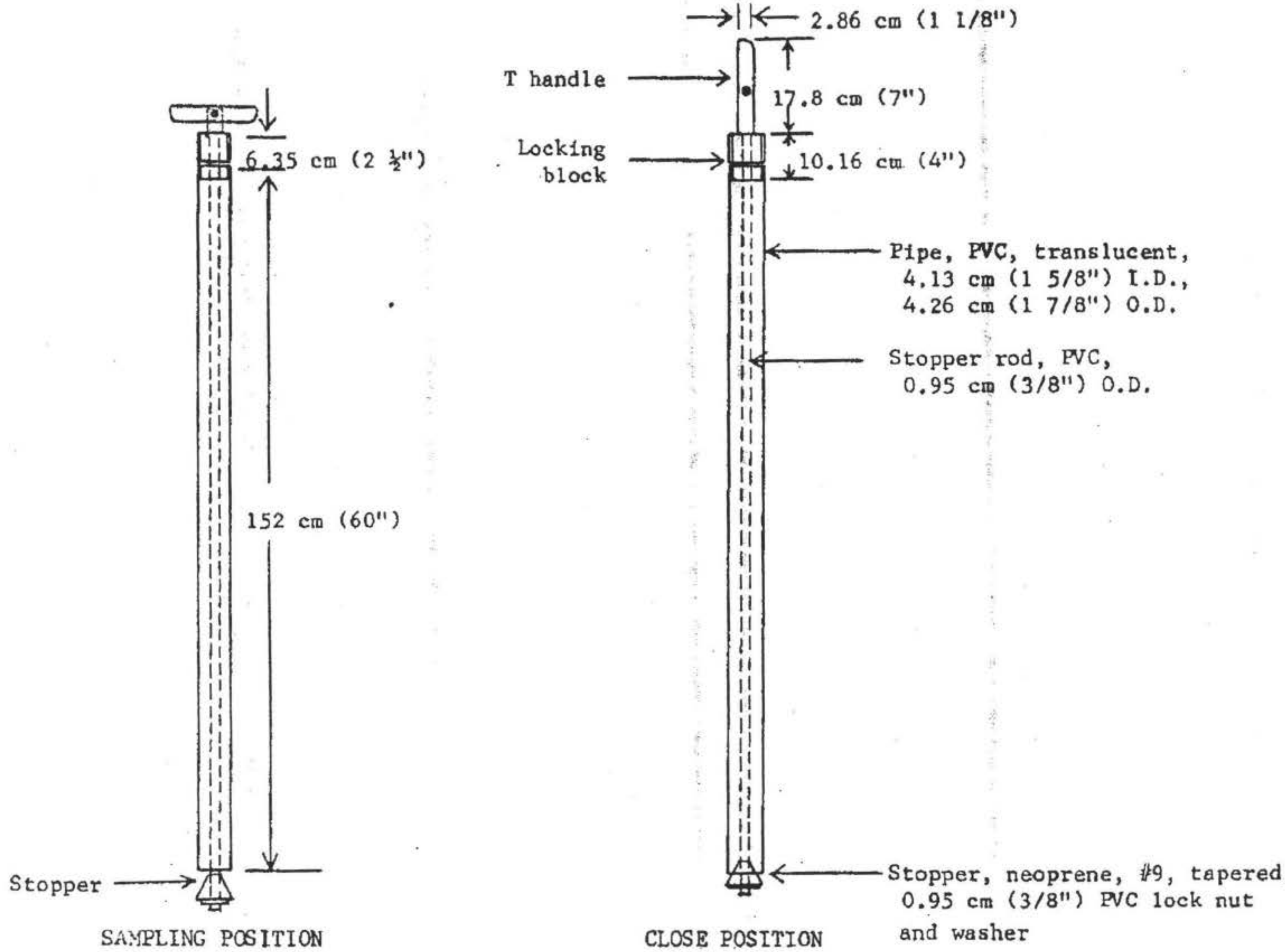


Figure 1. Composite liquid waste sampler (Coliwasa)

of the T-handle swivel. The closure system of the sampler consists of a sharply taped neoprene stopper attached to a 0.95-cm (3/8-in.) O.D. rod, usually PVC. The upper end of the stopper rod is connected to the swivel of the aluminum T-handle. The sharply tapered neoprene stopper can be fabricated according to specifications by plastic products manufacturers at an extremely high price, or it can be made in-house by grinding down the inexpensive stopper with a shop grinder as described in Note 1 of Appendix B.

Two types of Coliwasa samplers are made, namely plastic or glass. The plastic type consists of translucent plastic (usually PVC) sampling tube. The glass Coliwasa uses borosilicate glass plumbing pipe as the sampling tube and Teflon plastic stopper rod.

The complete list of parts for constructing the two types of Coliwasa samplers is given in Appendix B. The suppliers and approximate costs of the parts as well as the directions for fabricating the commercially unavailable parts are also given.

The sampler is assembled as shown in Figure 1 and as follows:

1. Attach the swivel to the T-handle with the 3.18 cm(1¼ in.) long bolt and secure with the 0.48 cm(3/16 in.) National Coarse(NC) washer and lock nut.

2. Attach the neoprene stopper to one end of the stopper rod and secure with the 0.95 cm(3/8 in.) washer and lock nut.

3. Install the stopper and stopper rod assembly in the sampling tube.

4. Secure the locking block sleeve on the block with glue or screws. This block can also be fashioned by shaping a solid plastic rod on a lathe to the required dimensions.

5. Position the locking block on top of the sampling tube such that the sleeveless portion of the block fits inside the tube, the sleeve sits against the top end of the tube, and the upper end of the stopper rod slips through the center hole of the block.

6. Attach the upper end of the stopper rod to the swivel of the T-handle.

7. Place the sampler in the close position and adjust the tension on the stopper by screwing the T-handle in or out.

<u>Uses</u>

The plastic Coliwasa is used to sample most containerized liquid wastes except wastes that contain ketones, nitrobenzene, dimethylforamide, mesityl oxide, and tetrahydrofuran.[3,4]

The glass Coliwasa is used to sample all other containerized liquid wastes that cannot be sampled with the plastic Coliwasa except strong alkali and hydrofluoric acid solutions.

Procedure for Use

1. Choose the plastic or glass Coliwasa for the liquid waste to be sampled and assemble the sampler as shown in Figure 1.

2. Make sure that the sampler is clean (see Section 5).

3. Check to make sure the sampler is functioning properly. Adjust the locking mechanism if necessary to make sure the neoprene rubber stopper provides a tight closure.

4. Wear necessary protective clothing and gear and observe required sampling precautions (see Section 6).

5. Put the sampler in the open position by placing the stopper rod handle in the T-position and pushing the rod down until the handle sits against the sampler's locking block.

6. Slowly lower the sampler into the liquid waste. (Lower the sampler at a rate that permits the levels of the liquid inside and outside the sampler tube to be about the same. If the level of the liquid in the sampler tube is lower than that outside the sampler, the sampling rate is too fast and will result in a nonrepresentative sample).

7. When the sampler stopper hits the bottom of the waste container, push the sampler tube downward against the stopper to close the sampler. Lock the sampler in the close position by turning the T handle until it is upright and one end rests tightly on the locking block.

8. Slowly withdraw the sampler from the waste container with one hand while wiping the sampler tube with a disposable cloth or rag with the other hand.

9. Carefully discharge the sample into a suitable sample container (see Section 6) by slowly opening the sampler. This is done by slowly pulling the lower end of the T handle away from the locking block while the lower end of the sampler is positioned in a sample container.

10. Cap the sample container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

11. Unscrew the T handle of the sampler and disengage the locking block. Clean sampler on site (see Section 5) or store the contaminated parts of the sampler in a plastic storage tube for subsequent cleaning. Store used rags in plastic bags for subsequent disposal.

12. Deliver the sample to the laboratory for analysis (see Section 6).

SOLID WASTE SAMPLERS

A number of tools are available for sampling solid substances. The most suitable of these for sampling hazardous solid wastes are the grain sampler, sampling trier, and the trowel or scoop.

Grain Sampler

The grain sampler (Figure 2) consists of two slotted telescoping tubes, usually made of brass or stainless steel. The outer tube has a conical, pointed tip on one end that permits the sampler to penetrate the material being sampled. The sampler is opened and closed by rotating the inner tube. Grain samplers are generally 61 to 100 cm (24 to 40 in.) long by 1.27 to 2.54 cm (½ to 1 in.) in diameter, and they are commercially available at laboratory supply houses.

Uses--

The grain sampler is used for sampling powdered or granular wastes or materials in bags, fiberdrums, sacks or similar containers. This sampler is most useful when the solids are no greater than 0.6 cm (¼ in.) in diameter.

Procedure for Use--

1. While the sampler is in the close position, insert it into the granular or powdered material or waste being sampled from a point near a top edge or corner, through the center, and to a point diagonally opposite the point of entry.[5]

2. Rotate the inner tube of the sampler into the open position.

3. Wiggle the sampler a few times to allow materials to enter the open slots.

4. Place the sampler in the close position and withdraw from the material being sampled.

5. Place the sampler in a horizontal position with the slots facing upward.

6. Rotate and slide out the outer tube from the inner tube.

7. Transfer the collected sample in the inner tube into a suitable sample container (see Section 6).

8. Collect two or more core samples at different points (see Section 6), and combine the samples in the same container.

9. Cap the sample container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

10. Clean (see Section 5) or store the sampler in plastic bag for subsequent cleaning.

11. Deliver the sample to the laboratory for analysis (see Section 6).

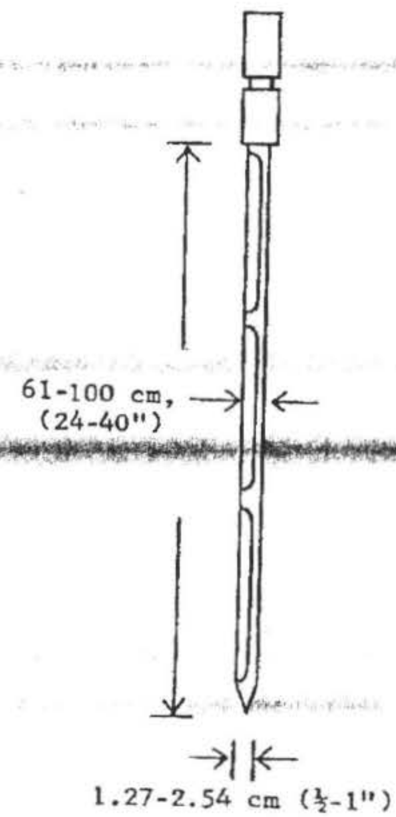


Figure 2. Grain sampler.

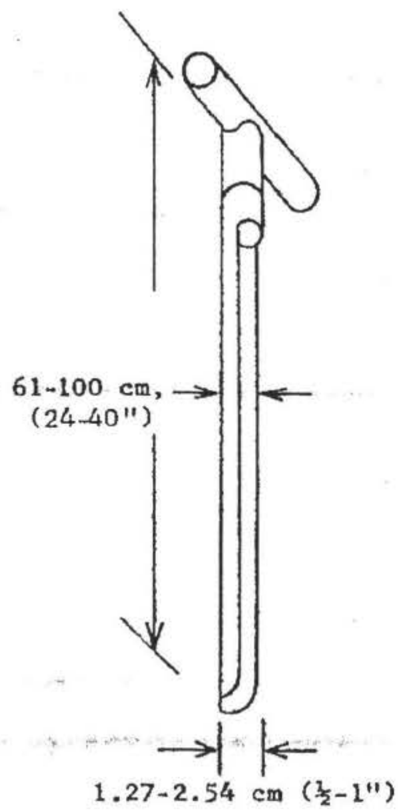


Figure 3. Sampling trier.

Sampling trier

A typical sampling trier (Figure 3) is a long tube with a slot that extends almost its entire length. The tip and edges of the tube slot are sharpened to allow the trier to cut a core of the material to be sampled when rotated after insertion into the material. Sampling triers are usually made of stainless steel with wooden handles. They are about 61 to 100 cm (24 to 40 in.) long and 1.27 to 2.54 cm (½ to 1 in.) in diameter. They can be purchased readily from laboratory supply houses.

Uses--

The use of the trier is similar to that of the grain sampler discussed above. It is preferred over the grain sampler when the powdered or granular material to be sampled is moist or sticky.

In addition, the sampling trier can be used to obtain soft or loosened soil samples up to a depth of 61 cm(24 in.) as outlined below.

Procedure for Use--

1. Insert the trier into the waste material at a 0 to 45° angle from horizontal. This orientation minimizes the spillage of sample from the sampler. Extraction of samples might require tilting of the containers.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. Transfer the sample into a suitable container (see Section 6) with the aid of a spatula and/or brush.

5. Repeat the sampling at different points (see Section 6). Two or more times and combine the samples in the same sample container.

6. Cap the sample container; attach the label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

7. Wipe the sampler clean, or store it in a plastic bag for subsequent cleaning.

8. Deliver the sample to the laboratory for analysis (see Section 6).

Trowel or Scoop

A garden-variety trowel looks like a small shovel (Figure 4). The blade is usually about 7 by 13 cm(3 by 5 in.) with a sharp tip. A laboratory scoop is similar to the trowel, but the blade is usually more curved and has a closed upper end to permit the containment of material. Scoops come in different sizes and makes. Stainless steel or polypropylene scoops with 7 by 15-cm(2 3/4 by 6-in.) blades are preferred. A trowel can be bought from hardware stores; the scoop can be bought from laboratory supply houses.

Uses--

An ordinary zinc-plated garden trowel can be used in some cases for sampling dry granular or powdered materials in bins or other shallow containers. The laboratory scoop, however, is a superior choice. It is usually made of materials less subject to corrosion or chemical reactions, thus lessening the probability of sample contamination.

The trowel or scoop can also be used in collecting top surface soil samples.

Procedure for Use--

1. At regular intervals (see Section 6), take small, equal portions of sample from the surface or near the surface of the material to be sampled.

2. Combine the samples in a suitable container (see Section 6).

3. Cap the container; attach the label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

4. Deliver the sample to the laboratory for analysis (see Section 6).

SOIL SAMPLERS

There is a variety of soil samplers used. For taking soil core samples, the scoop, sample trier, soil auger, and Veihmeyer sampler can be used. These samplers are commercially available and relatively inexpensive.

Scoop or Trowel

See the preceding section on solid waste samplers for the description of a scoop or trowel (Figure 4).

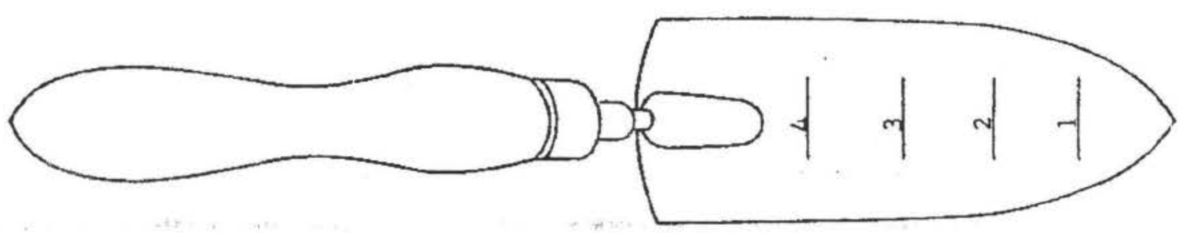


Figure 4. Trowel or scoop with calibrations.

Uses--

The scoop is used to collect soil samples up to 8 cm(3 in.) deep. It is simple to use, but identical mass sample units for a composite sample are difficult to collect with this sampler. The procedure for use of the scoop is outlined in the preceding section on solid waste samplers.

Sampling Trier

See the preceding section on solid waste samplers for the description of a sampling trier (Figure 3).

Uses--

This sampler can be used to collect soil samples at a depth greater than 8 cm(3 in.). The sampling depth is determined by the hardness and types of soil being sampled. This sampler can be difficult to use in stony, dry, very heavy, or sandy soil. The collected sample tends to be slightly compacted, but this method permits observation of the core sample before removal.[6]

Procedure for Use--

Procedure for use of the sampling trier can be found in the section on solid waste samplers.

Soil Auger

This tool consists of a hard metal central shaft and sharpened spiral blades (Figure 5). When the tool is rotated clockwise by its wooden T handle, it cuts the soil as it moves forward and discharges most of the loose soil upward. The cutting diameter is about 5 cm(2 in.). The length is about 1 m(40 in.), with graduations every 15.2 cm(6 in.). The length can be increased up to 2 m(80 in.). This tool can be bought from stores and, in some cases, from laboratory supply houses.

Uses--

The auger is particularly useful in collecting soil samples at depths greater than 8 cm(3 in.). This sampler destroys the structure of cohesive soil and does not distinguish between samples collected near the surface or toward the bottom. It is not recommended, therefore, when an undisturbed soil sample is desired.

Procedure for Use--

1. Select the sampling point (see Section 6) and remove unnecessary rocks, twigs, and other non-soil materials.

2. Install the sampler's wooden T handle in its socket.

3. Bore a hole through the middle of an aluminum pie pan large enough to allow the blades of the auger to pass through. The pan will be used to catch the sample brought to the surface by the auger.

4. Spot the pan against the selected sampling point.

5. Start augering through the hole in the pan until the desired sampling depth is reached.

6. Back off the auger and transfer the sample collected in the catch pan and the sample adhering to the auger to a suitable container (see Section 6). Spoon out the rest of the loosened sample with a sampling trier.

7. Repeat the sampling at different sampling points (see Section 6), and combine the samples in the same container as in step 6.

8. Cap the sample container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

9. Brush off and wipe the sampler clean, or store it in a plastic bag for subsequent cleaning.

10. Deliver the sample to the laboratory for analysis (see Section 6).

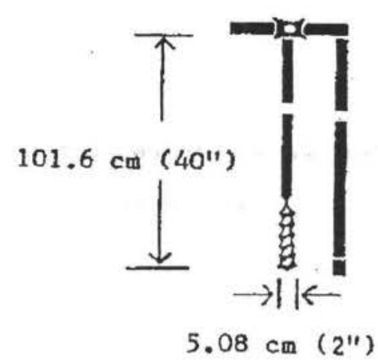


Figure 5. Soil auger.

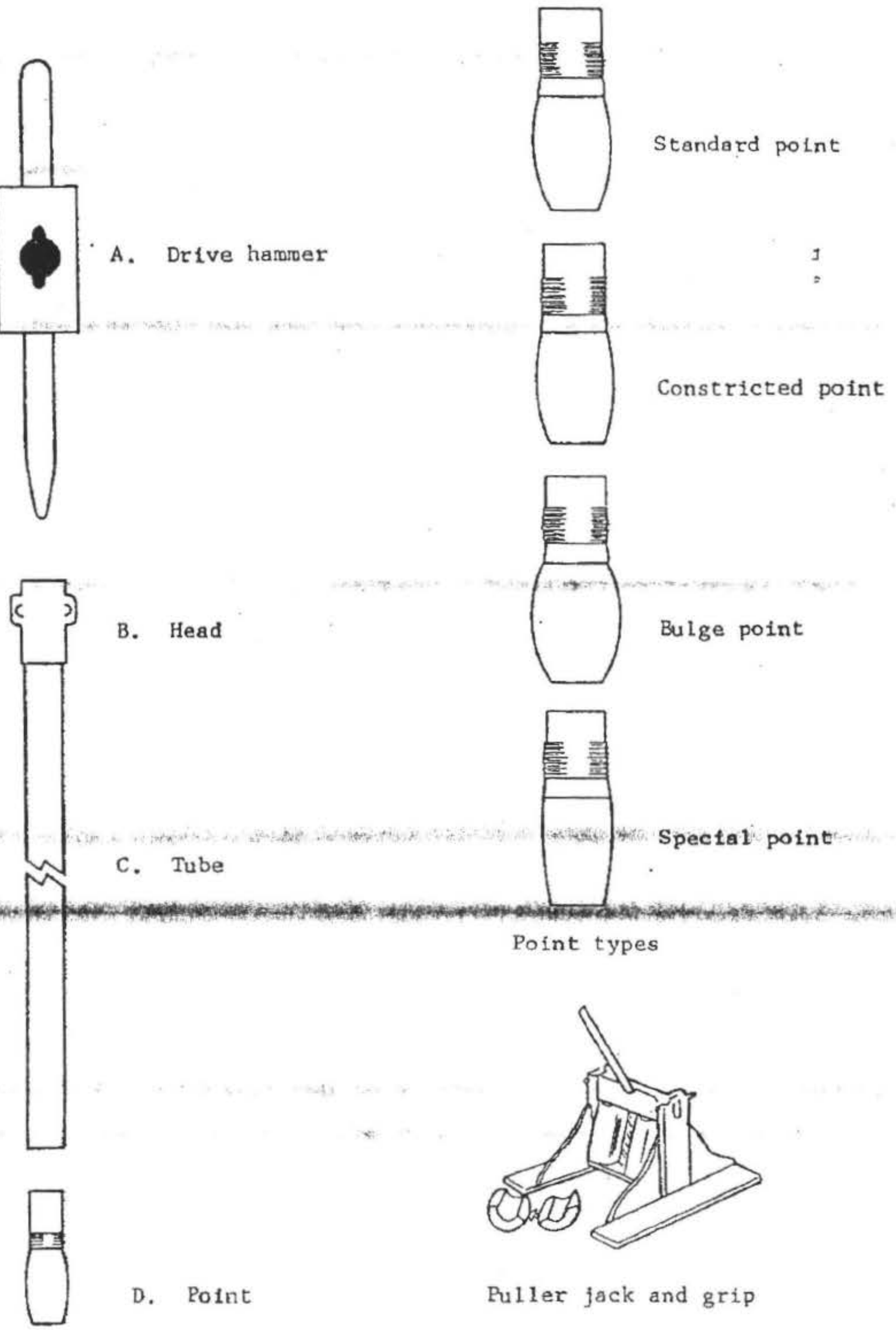


Figure 6. Veihmeyer sampler

Veihmeyer Soil Sampler

This sampler was developed by Professor F.J. Veihmeyer of the University of California in Davis.[7] The parts of a basic sampler and the corresponding costs are given in Table 1, and the basic sampler is shown in Figure 6.

TABLE 1. BASIC PARTS AND COSTS OF A VEIHMEYER SOIL SAMPLER

Part[a]	Cost[b]
Tube, 1.5 m (5 ft.)	$ 50.40
Tube, 3 m (10 ft.)	84.75
Tip, type A, general use	25.80
Drive head	29.05
Drop hammer, 6.8 kg (15 lb.)	71.85
Puller jack and grip[c]	161.90
Total	$ 433.75

[a] Only one of each part is needed. They are manufactured by Hansen Machine Works, 334 N. 12th Street, Sacramento, CA 95815.

[b] Based on August 1, 1977, price list.

[c] Recommended for deep soil sampling.

The tube is chromium-molybdenum steel and comes in various standard lengths from 0.91 to 4.9 m(3 to 16 ft.) and calibrated every 30.48 cm(12 in.). Longer tubes can be obtained on special order. Different points (Figure 6) are also available for different types of soil and sampling. Each point is shaped to penetrate specific types of soil without pushing the soil ahead of it, thus preventing the core from compacting in the tube. The standard point is adequate for most general sampling purposes. The inside taper of each point is designed to keep the sample from being sucked out of the tube as it is pulled from the ground. The drive head protects the top of the tube from deforming when the tube is driven into the ground with the drive hammer. The hammer doubles as a drive weight and handle when pulling the sampler from the ground. When the sampler tube cannot be pulled easily from the ground, a special puller jack and grip are also available. Specifications for the various parts of the Veihmeyer sampler are given as follows:

Points	Chrome-molly steel, heat-treated. Includes a standard point for general use, a constricted point for deep sampling in heavy clay (keeps core from being sucked out of the tube), a bulge point for shallow sampling in heavy clay, and a special point for dry sand. (See Figure 6D).
Drive hammer . .	Standard weight is 6.8 kg (15 lb.). (See Figure 6A)
Tubes . .	Chrome-molly steel. Maximum length is 4.9 m (16 ft.). (See Figure 6C).
Head . .	Chrome-molly steel, heat-treated. (See Figure 6B).
Puller jack . .	Cast aluminum frame with steel roller assembly and handle.
Grip . .	Chrome-molly steel, heat-treated.

Uses--

The Veihmeyer sampler is recommended for core sampling of most types of soil. It may not be applicable to sampling stony, rocky, or very wet soil.

Procedure for Use--

1. Assemble the sampler by screwing in the tip and the drive head on the sampling tube.
2. Insert the tapered handle (drive guide) of the drive hammer through the drive head.
3. Place the sampler in a perpendicular position on the soil to be sampled.
4. With the left hand holding the tube, drive the sampler into the ground to the desired sampling depth by pounding the drive head with the drive hammer. Do not drive the tube further than the tip of the hammer's drive guide.
5. Record the length of the tube that penetrated the ground.
6. Remove the drive hammer and fit the keyhole-like opening on the flat side of the hammer onto the drive head. In this position, the hammer serves as a handle for the sampler.

7. Rotate the sampler at least two revolutions to shear off the sample at the bottom.

8. Lower the sampler handle (hammer) until it just clears the two ear-like protrusions on the drive head and rotate about 90°.

9. Withdraw the sampler from the ground by pulling the handle (hammer) upwards. When the sampler cannot be withdrawn by hand, as in deep soil sampling, use the puller jack and grip.

10. Dislodge the hammer from the sampler; turn the sampler tube upside down; tap the head gently against the hammer; and carefully recover the sample from the tube. The sample should slip out easily.

11. Store the core sample, preferably, in a rigid, transparent, or translucent plastic tube when observation of soil layers is to be made. The use of the tube will keep the sample relatively undisturbed. In other cases, use a 1000-or 2000-ml (1-qt. or ½-gal) sample container (see Section 6) to store the sample.

12. Collect additional core samples at different points (see Section 6).

13. Label the samples; affix the seals; record in the field log book; complete analysis request sheet and chain of custody record; and deliver the samples to the laboratory for analysis (see Section 6).

Waste Pile Sampler

A waste pile sampler (Figure 7) is essentially a large sampling trier. It is commercially available, but it can be easily fabricated from sheet metal plastic pipe. A polyvinyl chloride plumbing pipe 1.52 m(5 ft) long by 3.2 cm(1¼ in.) I.D. by 0.32 cm(1/8 in.) wall thickness is adequate. The pipe is sawed lengthwise (about 60/40 split) until the last 10 cm(4 in.) The narrower piece is sawn off and hence forms a slot in the pipe. The edges of the slot and the tip of the pipe are sharpened to permit the sampler to cut into the waste material being sampled. The unsplit length of the pipe serves as the handle. The plastic pipe can be purchased from hardware stores.

Uses--

The waste pile sampler is used for sampling wastes in large heaps with cross-sectional diameters greater than 1 m(39.4 in.). It can also be used for sampling granular or powdered wastes or materials in large bins, barges, or silos where the grain sampler or sampling trier is not long enough. This sampler does not collect representative samples when the diameters of the solid particles are greater than half the diameter of the tube.

Procedure for Use--

1. Insert the sampler into the waste material being sampled at 0 to 45° from horizontal.

2. Rotate the sampler two or three times in order to cut a core of the material.

3. Slowly withdraw the sampler, making sure that the slot is facing upward.

4. Transfer the sample into a suitable container (see Section 6) with the aid of a spatula and/or brush.

5. Repeat the sampling at different sampling points (see Section 6) two or more times and combine the samples in the same sample container in step 4.

6. Cap the container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

7. Wipe the sampler clean or store it in a plastic bag for subsequent cleaning.

8. Deliver the sample to the laboratory for analysis (see Section 6).

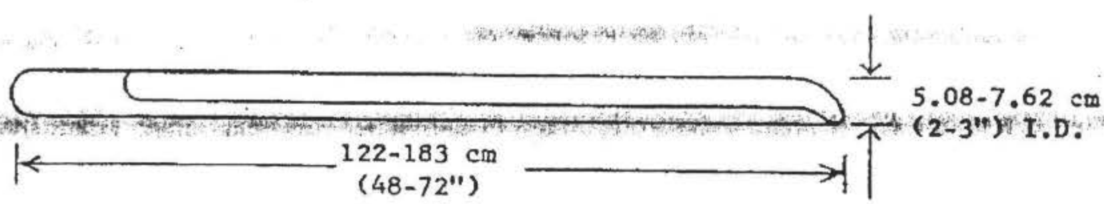


Figure 7. Waste pile sampler.

Pond Sampler

The pond sampler (Figure 8) consists of an adjustable clamp attached to the end of a two or three piece telescoping aluminum tube that serves as the handle. The clamp is used to secure a sampling beaker. The sampler is not commercially available, but it is easily and inexpensively fabricated. The tubes can be readily purchased from most hardware or swimming pool supply stores. The adjustable clamp and sampling beaker can be obtained from most laboratory supply houses. The materials required to fabricate the sampler are given in Table 2.

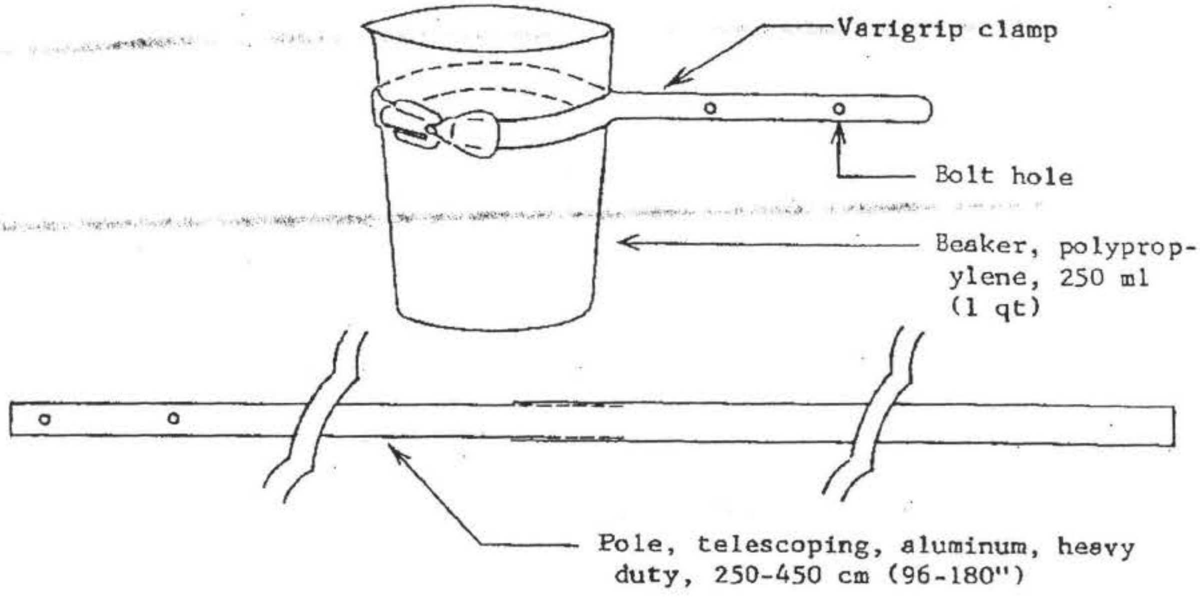


Figure 8. Pond sampler.

TABLE 2. BASIC PARTS AND APPROXIMATE COSTS OF A POND SAMPLER

Quantity	Item	Supplier	Approximate Cost
1	Clamp, adjustable, 6.4 to 8.9 cm(2½ to 3½ in.) for 250-to 600-ml(½ to 1½ pt.) beakers	Laboratory supply houses	$ 7.00
1	Tube, aluminum, heavy duty, telescoping extends 2.5 to 4.5 m(8 to 15 ft.) with joint cam locking mechanism. Pole diameters 2.54 cm(1 in.) I.D. and 3.18 cm(1¼ in.) I.D.	Olympic Swimming Pool Co. 807 Buena Vista Street, Alameda, Calif. 94501 or other general swimming pool supply houses.	16.24
1	Beaker, polypropylene, 250-ml(½ pt.)	Laboratory supply houses.	1.00
4	Bolts, 6.35 by 0.64 cm(2¼ by ¼ in.) NC	Hardware stores	.20
4	Nuts, 0.64 cm(¼ in.) NC	Hardware stores	.20
	Total		$24.64

Uses--

The pond sampler is used to collect liquid waste samples from disposal ponds, pits, lagoons, and similar reservoirs. Grab samples can be obtained at distances as far as 3.5 m($11\frac{1}{2}$ ft) from the edge of the ponds. The tubular aluminum handle may bow when sampling very viscous liquids if sampling is not done slowly.

Procedure for Use--

1. Assemble the pond sampler. Make sure that the sampling beaker and the bolts and nuts that secure the clamp to the pole are tightened properly.

2. With proper protective garment and gear (see Section 6), take grab samples from the pond at different distances and depths (see Section 6).

3. Combine the samples in one suitable container (see Section 6).

4. Cap the container; label and affix the seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

5. Dismantle the sampler; wipe the parts with terry towels or rags and store them in plastic bags for subsequent cleaning. Store used towels or rags in garbage bags for subsequent disposal.

6. Deliver the sample to the laboratory for analysis (see Section 6).

Weighted Bottle Sampler

This sampler (Figure 9) consists of a bottle, usually glass, a weight sinker, a bottle stopper, and a line that is used to open the bottle and to lower and raise the sampler during sampling. There are a few variations of this sampler, as illustrated in the ASTM Methods D 270[8] and E 300[9]. The ASTM sampler, which uses a metallic bottle basket that also serves as weight sinker, is preferred. The weighted bottle sampler can either be fabricated or purchased.

Uses--

The weighted bottle sampler can be used to sample liquids in storage tanks, wells, sumps, or other containers that cannot be adequately sampled with a Coliwasa. The sampler cannot be used to collect liquids that are incompatible or that react chemically with the weight sinker and line.

Procedure for use--

1. Assemble the weighted bottle sampler as shown in Figure 9.

2. Using protective sampling equipment, in turn, lower the sampler to proper depths to collect the following samples:

   a) upper sample - middle of upper third of tank contents.
   b) middle sample - middle of tank contents.
   c) lower sample - near bottom of tank contents.

3. Pull-out the bottle stopper with a sharp jerk of the sampler line.

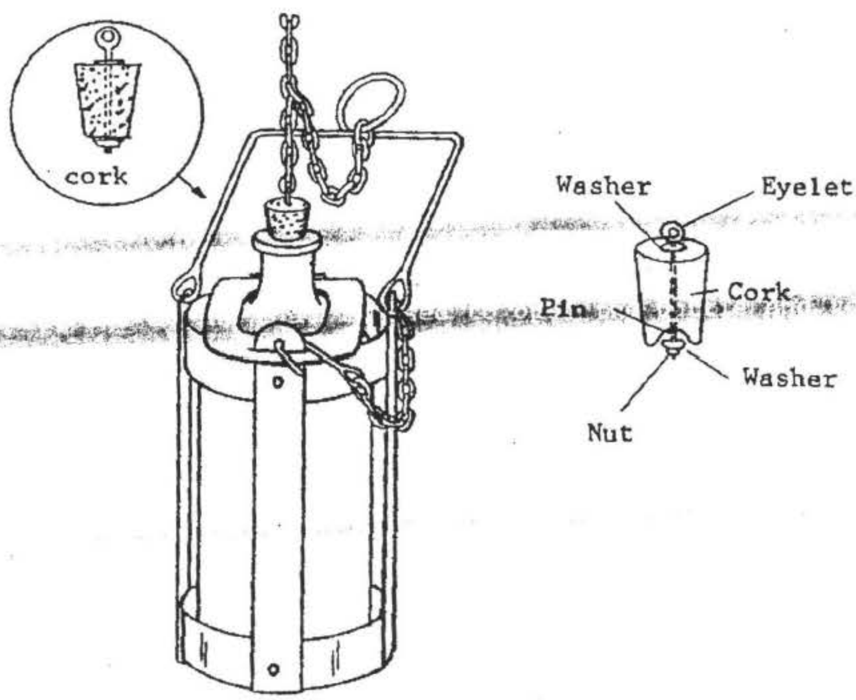
4. Allow the bottle to fill completely, as evidence by the cessation of air bubbles.

5. Raise the sampler and retrieve and cap the bottle. Wipe off the outside of the bottle with a terry towel or rag. The bottle can serve as the sample container.

6. Label each of the three samples collected; affix seal; fill out sample analysis request sheet and chain of custody record; record in the field log book.

7. Clean onsite or store contaminated sampler in a plastic bag for subsequent cleaning.

8. Deliver the sample to the laboratory for analysis (see Section 6). Instruct the laboratory to perform analysis on each sample or a composite of the samples.



1000 ml (1-quart) weighted bottle catcher

Figure 9. Weighted bottle sampler.

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List of Figures

Note: Figures D.1 through D.5 are presented in Appendix D-A

List of Tables

List of Referenced Drawings

Figures/Drawings located in Section Y, Referenced Drawings

Acronym Table

Clean Harbors Kansas, LLC (CHK)
Intermodal Container (IMC)
Container Management Unit (CMU)
Personal Protection Equipment (PPE)
Waste Analysis Plan (WAP)
National Fire Protection Association (NFPA)
United States Department of Transportation (USDOT)

D Introduction:

It is Clean Harbors Kansas, LLC's intention to remove Buildings B, D, and J from the RCRA Permit, and to effect partial closure of these areas. Additionally, the miscellaneous drum processing equipment located in the Process Building will also be closed.

The purpose of this section is to provide information regarding the design and operation of the various container management units at the Clean Harbors Kansas, LLC (CHK). This information is provided to fulfill the requirements of Kansas Administrative Regulations (KAR), Title 28, Article 31 as well as federal regulations as set forth in 40 CFR Part 264 Subpart I, and 40 CFR 270.15. The KAR incorporate, with few additions, the RCRA regulations contained in 40 CFR Parts 260 through 270. Therefore, this section will refer only to the federal regulations.

As used in this permit application, the term "drum" is intended to describe a specific type of container, namely a fifty-five (55) gallon drum, approximately twenty-three (23) inches in diameter and thirty-four (34) inches high. The term "bulk container" is used to describe any container with a capacity greater than 450 gallons. Roll-on/roll-off boxes, gondolas, sludge boxes and Intermodal Container (IMC)s are examples of types of bulk containers that may be managed at Clean Harbors Kansas, LLC. Otherwise, the term container, as used in this application, shall have the same meaning as that listed in 40 CFR 260.10.

D-1 Summary Description:

Referenced Drawings

Figure D.1, Hazardous Waste Management Areas
Figure D.2, Wichita Facility Site Plan – Material Containment Areas

Under the last RCRA Permit there were seven (7) storage buildings subdivided into individual Container Management Unit (CMU)s at the CHK facility utilized for container storage and processing of hazardous waste. Location of these storage buildings is shown on Figure D.1, Hazardous Waste Management Areas. Clean Harbors Kansas intends to effect partial closure of five of these areas. The Four individual CMUs CHK indents to keep in RCRA service are shown on Figure D.2, Wichita Facility Site Plan - Material Containment Areas. Building C, Building I, the Drum Dock associated with Building C, and the Process Building are intended to remain in RCRA service. Figures showing individual storage buildings are presented in Appendix D-A, Referenced Drawings. Specific information regarding areal extent, capacity and drum equivalents is discussed in Section A (Part A Permit Application; Addendum B). Capacities of container storage buildings are summarized in Table D.1, Container Storage Building Capacities. Table D.2, CMU Containment Summary, presents containment capacities for each CMU. Building C, Building I, the Drum Dock associated with Building C, and the Process building will have a combined storage capacity of 174570 gallons. Formerly, the total permitted capacity for storage of containers at the CHK facility was 325,490 gallons.

CHK has made the assumption, for design purposes, that all containers of hazardous wastes managed at CHK contain free liquid; thus, containment as prescribed in 40 CFR 264.175 is provided for all CMUs. The design does not preclude storage of wastes that do not contain free liquids.

40 CFR 264.175(b)(3) requires that the secondary containment system contain the volume of the largest container, or ten (10) percent of the volume of the containers in the unit, whichever is greater. Containment areas have been designed to meet this requirement. Secondary containment calculations are shown in Appendix D-B, Secondary Containment Calculations. All containment areas are sloped to blind sumps for the accumulation liquids. The liquid is then pumped out of the sumps and properly handled.

A wide variety of containers other than drums may be stored within the waste storage buildings. Wastes with free liquids may be stored in containers such as tote boxes, overpack containers, etc. The total volume of waste in containers is limited by the secondary containment volumes provided for each CMU and by the capacity of each storage building. The total volume of waste stored at the facility will not exceed the permitted amount (i.e., 174570 gallons).

Containerized hazardous wastes are delivered to the facility by truck. These containers may be managed in unloading areas prior to waste storage.

Containers may be located within other waste management units and are used to accumulate and store site generated residues such as, incidental spills, discarded Personal Protective Equipment (PPE), etc. CHK will manage these wastes according to the standards set forth in 40 CFR Part 262. Containers of on-site generated wastes will not be accumulated for more than ninety (90) days within these areas, and will be accumulated in containers complying with 40 CFR 264 Subpart I.

Storage building CMUs have been designed to receive many categories of waste streams in drums, overpacks, gondolas, tote boxes, etc. The number of segregated containment units provides the capability to store various waste types within certain units, and meet the requirements for managing reactive, ignitable and incompatible wastes. Any of the CMUs may be used to store any container type and volume as dictated by operational needs and compatibility requirements. Specifications regarding layout of these buildings are presented later in this section; brief descriptions of each storage building are provided below.

D-1a <u>The Process Area:</u>

The Process Area is designed to accommodate storage of wastes in containers and tanks (tank management is addressed in Section E, Tank Systems). This building is managed as two operational areas; the tanker unloading bay, and the bulk tank farm which share common secondary containment.

D-1b <u>Building C:</u>

Building C is utilized for container storage and management. Waste managed in this area may be processed or treated at the facility. Diking divides this building into seven (7) contained areas.

D-1c <u>Drum Dock:</u>

The Drum Dock is utilized for container storage, treatment, and management. Waste managed in this area may be processed or treated in containers. Diking provides one (1) contained area in this building.

D-1d <u>Building I:</u>

The Building I is utilized for container storage, and management. Waste managed in this area may be processed or treated in containers. Rooms Diking provides one (1) contained area in this building.

Table D.1

Container Storage Building Capacities

Container Storage Building	Materials Managed	Permitted Storage Capacity (Gallons)	Storage Capacity (55 Gallon Drum Equivalents)
Processing Area	Liquid and solid hazardous and/or non-hazardous materials	9,900	180
Building C	Ignitable and non-ignitable hazardous and non-hazardous materials	99,110	1,802
Drum Dock	Containerized materials	14,960	272
Building I	Containerized materials	50600	920
Total Capacity		174570	3174

Note: Total capacity (gallons) is the additive container storage capacity for all storage buildings. Note that additional storage of waste in tanks occurs in some of these areas; permitted waste tank storage capacity is not reflected in this summary.

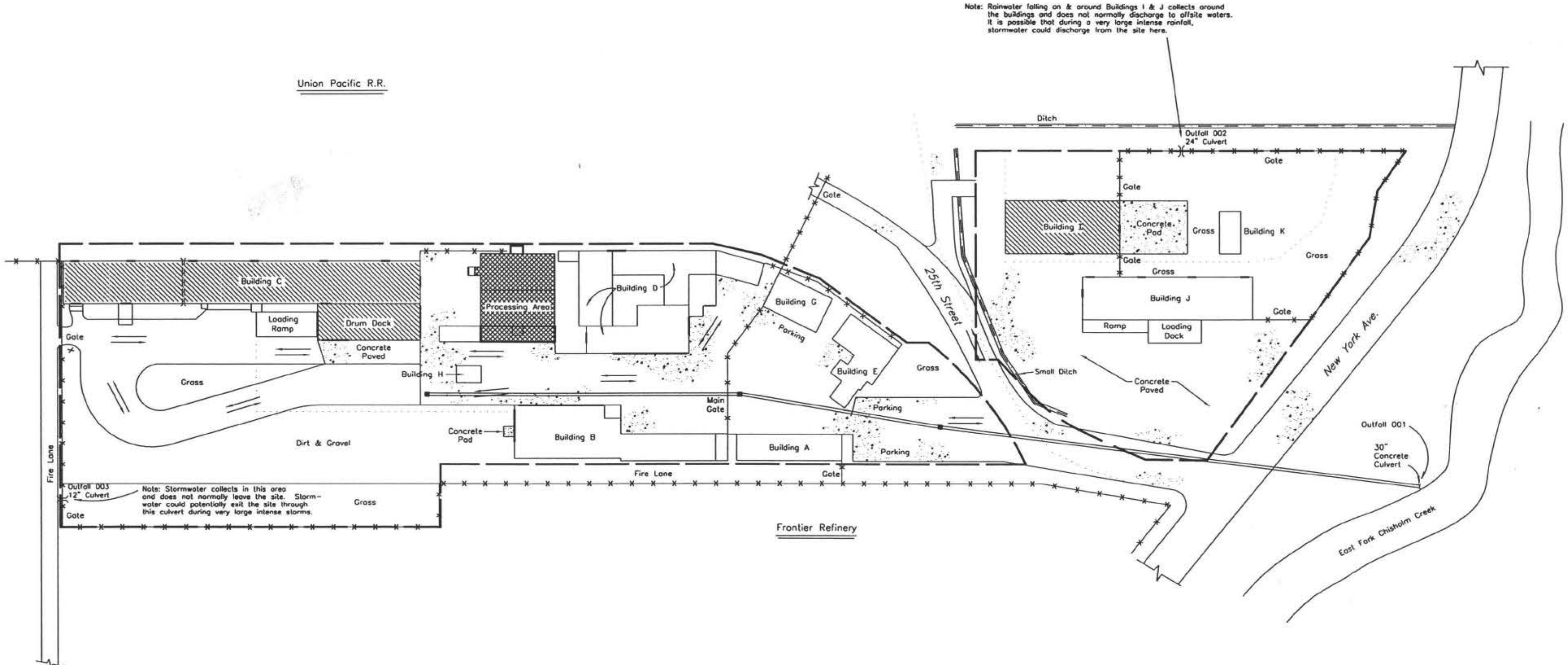
Table D.2

CMU Containment Summary

Container Management Unit (CMU)	Maximum Number of Drums Stored (55 gallon drum equivalents)		Gallons - Containment Capacity Required for Containers (10 % Container Capacity)	Gallons - Containment Provided
	Drums	Gallons		
P100/P200	180	9,900	990	32,583
C100	16	880	88	244
C200	16	880	88	192
C300	240	13,200	1,320	3,842
C400	184	10,120	1,012	3,195
C500	192	10,560	1,056	3,233
C600	192	10,560	1,056	3,233
C700	962	52,910	5,291	16,690
I100	416	22880	2288	4503
I200	64	3520	352	635
I300	440	24,200	2420	6088
L100	272	14,960	1,496	1,835

Note 1: These containment volume requirements do not include requirements for tank systems. The letter shown in the CMU identification number indicates the location by building (P - Processing Area, C - Building C, I-Building I, and L - Drum Dock).

Note 2: The largest container in Area P100 would be a 5,000 gallon tanker. The containment provided (9,900 gallons) is sufficient to hold the volume of this container.



Building Legend

Building A	Laboratory/Administration
Building C	Hazardous Waste Management Building
Building E	Administration
Building G	Personnel Decon/Break Room
Building H	Operations Office
Building I	Hazardous Waste Management Building
Processing Area	Hazardous Waste Management Area
Drum Dock	Hazardous Waste Management Area

Legend:

- : Railroad Tracks
- : Fence
- : Property Line
- : Container Storage Area
- : Container and Tank Storage Area
- : Loading and Unloading Area
- : Secondary Containment Berm or Wall
- : Pavement
- : Drainage Boundary
- : Storm Drain Catch Basins
- : Underground Storm Sewer Line
- : Truck Routes

FIGURE D-1

REV.	DESCRIPTION	DRAWN BY	DATE	APPR. BY
C	RCRA PART B SUBMITTAL UPDATE	K.M.C.	9/3/10	S.A.B.
B	RCRA PART B SUBMITTAL UPDATE	K.M.C.	3/27/09	M.C.
A	RCRA PART B SUBMITTAL	K.M.C.	6/20/08	M.C.

REFERENCE DRAWINGS

CleanHarbors

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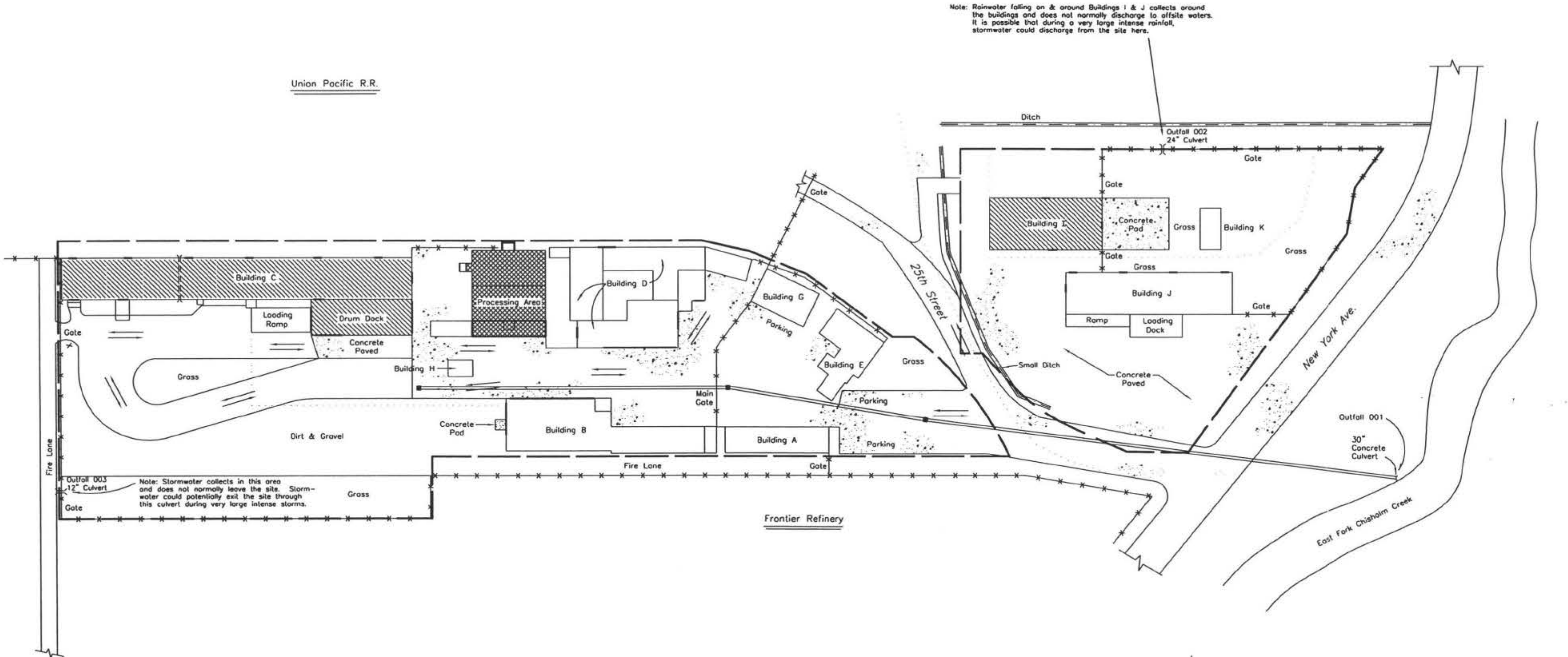
DRAWN	CHECKED	SCALE	DATE
K.M.C.	M.C.	AS NOTED	04/01/08

TITLE
CLEAN HARBORS KANSAS, LLC
WICHITA FACILITY
HAZARDOUS WASTE MANAGEMENT AREAS

DRAWING NO. HWMA
REV. C



Building Legend

Building A	Laboratory/Administration
Building C	Hazardous Waste Management Building
Building E	Administration
Building G	Personnel Decon/Break Room
Building H	Operations Office
Building I	Hazardous Waste Management Building
Processing Area	Hazardous Waste Management Area
Drum Dock	Hazardous Waste Management Area

Legend:

: Railroad Tracks
: Fence
: Property Line
: Container Storage Area
: Container and Tank Storage Area
: Loading and Unloading Area
: Secondary Containment Berm or Wall
: Pavement
: Drainage Boundary
: Storm Drain Catch Basins
: Underground Storm Sewer Line
: Truck Routes

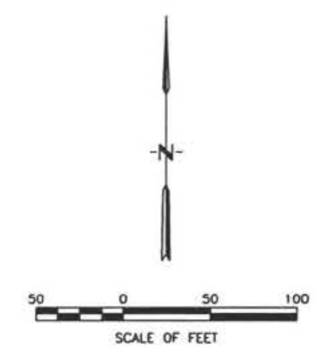


FIGURE D-2

REV.	DESCRIPTION	DRAWN BY	DATE	APPR. BY
C	RCRA PART B SUBMITTAL UPDATE	K.M.C.	9/3/10	S.A.B.
B	RCRA PART B SUBMITTAL UPDATE	K.M.C.	3/27/09	M.C.
A	RCRA PART B SUBMITTAL	K.M.C.	6/20/08	M.C.

REFERENCE DRAWINGS

CleanHarbors

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DRAWN	CHECKED	SCALE	DATE
K.M.C.	M.C.	AS NOTED	04/01/08

TITLE
CLEAN HARBORS KANSAS, LLC
WICHITA FACILITY
SITE PLAN

DRAWING NO. WICHSITE

REV. C

D-2 Storage in Containers with Free Liquids:

D-2a General Area Design Features:

Waste storage buildings were constructed for industrial use and are generally of metal or cinder block fabrication. Buildings perform a variety of functions including control of access, ambient temperature, precipitation ingress, and wind effects such as dust generation.

The storage buildings are covered to minimize ingress of precipitation. The individual CMUs are constructed on concrete pads with perimeter curbs (diking) to contain potential spills, to prevent run-off, and to prevent run-on. Containment capacity is adequate to contain incidental precipitation (i.e., precipitation blown in).

Secondary containment consists of concrete diking/walls or block construction on concrete pads. Concrete pads and diking/walls that make up the secondary containment are maintained to prevent or repair cracks and gaps. All joints contain a continuous water stop or are otherwise sealed to prevent migration of liquids.

Diking separates containment areas of individual CMUs. Waste containers are palletized or equipped with skids during storage, or are otherwise managed to protect the outside walls of the containers from contact with accumulated liquids. Concrete surfaces of the secondary containment systems are sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.

Rooms have open areas which provide maneuvering room for mobile equipment such as forklifts, and, if needed, for staging and/or stacking of drums during pre-acceptance and processing.

D-2b <u>Unloading Areas:</u>

Containerized hazardous wastes are unloaded onto the Drum Dock, or the Tanker Unloading Bay, which are provided with secondary containment. Containers are placed into CMUs upon completion of unloading procedures or within 72 hours, whichever comes first. Pages D-23 to D-26 provides a more detailed discussion of the unloading procedures and Appendix C-A details the sampling procedures.

Prior to placement in permitted storage, waste in containers will be managed in unloading areas and/or staged in an appropriate CMU. Containers arriving on-site by truck may be unloaded at any of the three (3) storage areas as need. See Figure D.1, Hazardous Waste Management Areas, for location of unloading areas.

D-2c <u>Processing Area:</u>

Referenced Drawings

Figure D.3, Process Building

The Processing Area is designed to manage hazardous wastes in tanks and containers in two operational areas with shared secondary containment (storage in tanks is addressed in Section E, Tank Systems). Containerized wastes managed in this area include liquids that will be pumped to bulk storage, and individual waste containers that will be stored inside of the containment area. These materials are destined for, recycling as waste fuel, neutralization, or transport off-site for additional management. The operation of the tank systems are described in detail in Section E, Tank Systems.

D-2c(1) Secondary Containment:

The Processing Area is divided into two (2) operational areas, P100 and P200. These two areas are managed as a shared secondary containment system. These areas are shown on Figure D.3, Process Building. The CMUs are designed to meet the storage requirements for RCRA regulated wastes, to promote sound container management practices, and to minimize the potential for a release of hazardous waste into the environment. The CMUs are constructed of concrete floors and diking which are free of cracks and gaps. Additionally, the entire area has been lined with a chemically resistant coating to comply with the requirements of 40 CFR 264.193.

40 CFR 264.175(b)(3) requires that the secondary containment system contain the volume of the largest container, or ten (10) percent of the volume of the containers in the unit, whichever is greater. Any size container may be managed in a CMU provided that the maximum sized container does not exceed the CMU's containment volume. Detailed calculations supporting the secondary containment and storage volumes in the Processing Area may be found Tables D.1 and D.2.

D-2c(2) **Building Design:**

The Processing Area consists of one CMU shared by two operational areas, and its overall size is approximately eight-three (83) feet long by seventy-one (71) feet wide. Some management of containers may occur directly on the concrete floor (e.g., during sampling). Concrete curbs or walls around the unit or portable containment units provide secondary containment. Adequate secondary containment volume is provided for this building, as described in D-2d(1).

D-2d <u>Building C:</u>

Referenced Drawings

Figure D.4, Building C

Building C is designed to manage containerized wastes in seven (7) CMUs. Containerized wastes managed in Building C include ignitable and non-ignitable hazardous and non-hazardous wastes. These materials are destined for on-site management, recycling as waste fuel, neutralization, or transport off-site for additional management. Processing of containerized wastes in Building C may involve treatment in containers or management in any of the several on-site processing units.

The principal processes which occur in Building C are storage, treatment in containers, repackaging, bulking, consolidation of solid residues, and loading and unloading of hazardous waste in containers.

D-2d(1) <u>Secondary Containment:</u>

Building C is divided into seven (7) areas (CMUs) of secondary containment by diking. These areas are shown on Figure D.4, Building C, (Figure D.4, Building C). The CMUs are designed to meet the storage requirements for RCRA regulated wastes, to promote sound container management practices, and to minimize the potential for a release of hazardous waste into the environment. The CMUs are constructed of concrete floors and diking which are free of cracks and gaps.

40 CFR 264.175(b)(3) requires that the secondary containment system contain the volume of the largest container, or ten (10) percent of the volume of the containers in the unit, whichever is greater. Any size container may be managed in a CMU provided that the maximum sized container does not exceed the CMU's containment volume. Detailed calculations supporting the secondary containment and storage volumes in Building C may be found in Tables D.1, and D.2.

D-2d(2) **<u>Building Design:</u>**

Building C consists of seven (7) CMUs, and its overall size is approximately three-hundred-thirty-eight (338) feet long by forty (40) feet wide. Waste containers managed in Building C are palletized or equipped with skids during storage, or are otherwise managed to protect the outside walls of the containers from contact with accumulated liquids. Some management of containers may occur directly on the concrete floor (e.g., during processing). Concrete curbs or walls around the unit or portable containment units provide secondary containment. Adequate secondary containment volume is provided for this building, as described in Tables D.1, and D.2.

D-2e Drum Dock:

Referenced Drawings

Figure D.5, Drum Dock

The Drum Dock is designed to manage containerized wastes in one (1) contained area (CMU). Containerized wastes managed in this area include hazardous and non-hazardous materials. These materials are destined for recycling as waste fuel, neutralization or transport off-site for additional management.

The principal processes that occur in the Drum Dock are storage, sampling, and loading and unloading of hazardous waste in containers.

D-2e(1) Secondary Containment:

The Drum Dock is made up of one area (CMU); this area is diked to provide secondary containment. The area is shown on Figure D.5, Drum Dock, (see Figure D.5, Drum Dock). This CMU is designed to meet the storage requirements for RCRA regulated wastes, to promote sound container management practices, and to minimize the potential for a release of hazardous waste into the environment. The CMU is constructed of a concrete floor and diking which are free of cracks and gaps. Additionally, the CMU has been lined with a chemically resistant coating for added protection.

40 CFR 264.175(b)(3) requires that the secondary containment system contain the volume of the largest container, or ten (10) percent of the volume of the containers in the unit, whichever is greater. Any size container may be managed in a CMU provided that the maximum sized container does not exceed the CMU's containment volume. Secondary containment calculations for the Drum Dock are presented in Tables D.1, and D.2.

D-2e(2) **Building Design:**

The Drum Dock consists of one (1) area (CMU), and its overall size is approximately ninety-four (94) feet long by twenty-seven (27) feet wide. Waste containers managed in the Drum Dock are palletized or equipped with skids during storage, or are otherwise managed to protect the outside walls of the containers from contact with accumulated liquids. Some management of containers may occur directly on the concrete floor (e.g., during sampling or loading/un-loading). Concrete curbs or walls around the unit or portable containment units provide secondary containment. Adequate secondary containment volume is provided for this building, as described Tables D.1, and D.2.

D-2f **Building I:**

Referenced Drawings

Figure D.6, Building I

The Building I is designed to manage containerized wastes in three (3) contained areas (CMU). Containerized wastes managed in this area include hazardous and non-hazardous materials. These materials are destined for recycling as waste fuel, neutralization, or transport off-site for additional management.

The principal processes which occur in Building I are storage, treatment in containers, repackaging, bulking, consolidation of solid residues, and loading and unloading of hazardous waste in containers

D-2e(1) Secondary Containment:

The Building I is made up of three(3) area (CMU); these areas are diked to provide secondary containment. These areas are shown on Figure D.6, Building I, (see Figure D.6, Building I). These CMU are designed to meet the storage requirements for RCRA regulated wastes, to promote sound container management practices, and to minimize the potential for a release of hazardous waste into the environment. These CMU are constructed of a concrete floor and diking which are free of cracks and gaps. Additionally, these CMU have been lined with a chemically resistant coating for added protection.

40 CFR 264.175(b)(3) requires that the secondary containment system contain the volume of the largest container, or ten (10) percent of the volume of the containers in the unit, whichever is greater. Any size container may be managed in a CMU provided that the maximum sized container does not exceed the CMU's containment volume. Secondary containment calculations for the Bulding are presented in Tables D.1, and D.2.

D-2e(2) **Building Design:**

The Building I consists of three (3) areas (CMU), and its overall size is approximately one-hundred-six(106) feet Long by forty-eight (48) feet wide. Waste containers managed in the Building I are palletized or equipped with skids during storage, or are otherwise managed to protect the outside walls of the containers from contact with accumulated liquids. Some management of containers may occur directly on the concrete floor (e.g., during sampling or loading/un-loading). Concrete curbs or walls around the unit or portable containment units provide secondary containment. Adequate secondary containment volume is provided for this building, as described Tables D.1, and D.2.

D-3 General Container Management Practices:

D-3a Description of Containers:

The CMUs are capable of receiving and processing containers, both new and used, of various materials of construction, sizes, and capacities. The volume of individual containers managed in the CMUs is typically 450 gallons or less, except in the truck bay area, in the Process Building where bulk liquid tankers and roll-off boxes containing solids may be stored. A wide variety of other containers, such as paint cans, Marino bags, wooden cases, plastic tote tanks, and glass bottles may also be received.

Bulk containers managed on-site include, but are not limited to, IMCs, sludge boxes, gondolas, tankers, and end dumps. The tanker unloading bay in the Process Building has secondary containment and design capabilities for bulk containers. Bulk containers may be used for virtually any of the waste types handled at the facility. CHL will not place wastes into an unwashed container that has previously held incompatible wastes.

D-3b Handling of Containers: 40 CFR 264.173.

The majority of containers managed at the CHK facility are expected to be drums or similar containers delivered in van trailers. An industrial truck equipped with drum handling forks or a single container hand trolley will generally be employed to unload non-palletized shipments.

Palletized containers will generally be unloaded with an industrial truck equipped with forks. Other container movement equipment may be used as available and appropriate. Ramps will be used as necessary during transfer operations to facilitate movement of materials in and out of CMUs.

Containers may be moved within the facility by hand, by industrial truck, truck, or by other safe and appropriate means. The specific method employed will be dependent on the distance, and the quantities and sizes of containers to be moved.

When moving containers between storage areas, loading areas, and/or process areas, the facility may need to temporarily stage containers prior to transfer to the next unit. This staging will generally occur in the unloading areas or in the area between Building C and the Processing Area. All staging will occur in paved areas. This staging of containers will not exceed one shift or eight hours.

Equipment is available to facilitate such operations as the transfer of wastes from a damaged container to a container in good condition, the manual repackaging of containers, the transfer of leaking containers into overpacks, and the removal of individual containers from CMUs.

During the unloading procedure, the containers will be visually checked. Those containers selected for sampling and analysis will be opened and sampled as described in Section C, Waste Characterization, Appendix C-A, Waste Analysis Plan (WAP). Sampling may occur on the unloading platform, in the working area, in a CMU or, prior to unloading, on the transport vehicle. Once samples have been obtained, the containers will be re-closed and will remain staged or be placed in a CMU until incoming load procedures are completed in accordance with the WAP. Containers that are not already in a containment unit will be moved into a CMU after the incoming load procedures are completed and the waste stream is accepted. If incoming load procedures cannot be completed in 72 hours, containers will be placed in an appropriate CMU, based on manifest, pre-acceptance, and other information available about the waste. If subsequent analytical or other information identifies a compatibility problem, the container will be moved to an appropriate CMU, rejected and returned to the generator, or transferred to another facility capable of handling the material.

Containers will be opened by one of a variety of methods. Liquid storage containers equipped with screw-in bungs in the lids will generally be sampled by removing the bung, withdrawing a sample and replacing the bung. Containers with fully removable tops (i.e., with retaining rings) will generally be opened by removing the lid and ring, sampling and replacing the lid and ring.

Containers are normally kept closed during storage. However, they may be opened for:

- inspection,
- sampling,
- removal/addition of material.

Regularly scheduled inspections of the CMUs, loading/unloading areas, and processing areas are conducted to facilitate detection of open or deteriorating containers, improper storage in the CMUs, liquids on the floors or in sumps, or other improper conditions as outlined in Section F, Inspection Plan. The frequencies of these inspections are defined in the Inspection Plan.

Hazardous and non-hazardous wastes may be stored within the same CMU, but they will not be stored on the same pallet, except insofar as they have been received on the same pallet (e.g., lab packs, wrapped pallets, etc.). The Waste Tracking System will provide a record of the location of all wastes at the facility. This report will be available for facility personnel and inspectors to identify the location of both hazardous and non-hazardous wastes at the facility.

During the incoming load and off-loading procedures containers are clearly marked to identify the contents and the date each period of accumulation begins. This is for purposes of meeting the requirements of 40 CFR 268.50,

CHK will address and implement air emission control devices for the affected container management activities as applicable.

D-3b(1) Containers - 55 Gallon or Larger:

At times, 55 gallon or larger containers may be stacked two (2) high (double-stacked), providing that the wastes are compatible and that such stacking is consistent with the National Fire Protection Association (NFPA) code for flammable storage.

Inspection aisles of two (2) feet or more in width will be maintained between adjacent double rows of 55-gallon or larger containers in CMUs.

The bottom layer of containers in storage are placed on pallets or skids, or are otherwise managed to prevent contact of containers with any accumulated liquids. Rows will be no more than two (2) 55-gallon or larger containers wide. Dividers such as wooden pallets or plywood sheeting may be placed on top of the bottom row(s) of drums. A second layer of containers may be placed on top of the bottom row.

D-3b(2) Containers - Smaller Than 55 Gallon:

Smaller containers, particularly those small volume containers such as pint, quart, gallon, and five (5) gallon sizes, may be stored in stacks more than two (2) high, and will frequently be received that way. Any stacking of containers not specifically regulated by the NFPA code will be performed with safety of personnel uppermost in mind. Stacking of containers of less than fifty-five (55) gallon capacity will be restricted to a height not to exceed six (6) feet to facilitate inspection. This does not preclude, as an accepted management practice, the placing of large numbers of small containers within drums or larger overpack containers, and the double stacking of these larger containers, nor the storage of individual containers which may exceed a height of six (6) feet, nor the stacking of palletized small containers. The total volume of containers of wastes with free liquids will not be allowed to exceed that allowed by the secondary containment capacity.

Where applicable, inspection aisles of two (2) feet or more in width will be maintained in CMUs between adjacent rows of pallets of containers that hold less than 55 gallons.

The Waste Tracking System will provide a record of the location of each container of waste received at the facility, including those containers that are arranged or stacked in such a way that not all labels may be visible from the aisle. The Waste Tracking System will be updated at least once each day that containers of waste are moved.

D-3c <u>Waste and Container Compatibility:</u> 40 CFR 264.172

Wastes accepted for storage, treatment, or other management are required to be compatible with the containers used to store them. Acceptable containers for acidic wastes may include those made of plastic, steel lined with plastic, or fiberglass. Acceptable containers for other wastes include, but are not limited to, steel, fiberglass, plastic, steel lined with plastic, and fiber drums and boxes, wooden cases, and fiber sacks. Solvent wastes are frequently stored in steel drums. Alkaline wastes may be stored in plastic containers or containers manufactured from carbon steel. Fiber sacks may be used to store, among other materials, contaminated debris or soils. New types of containers are routinely being developed and approved by the United States Department of Transportation (USDOT); USDOT and Performance Oriented Packaging Standards will dictate the shipment in, and use of, alternate containers meeting regulated performance requirements. CHK may receive waste in any appropriate USDOT approved or performance specified container for management at the facility. Site-generated waste may be accumulated in specially designed containers specific to the plant process equipment.

D-3d <u>Condition of Containers:</u> 40 CFR 264.171

Facility personnel will inspect all containers for evidence of leakage, deterioration, or severe corrosion as part of the incoming load and unloading procedures at Clean Harbors Kansas, LLC. Containers are also routinely inspected while in storage. Inspection schedules are discussed in Section F, Inspection Plan. Containers exhibiting evidence of leakage, deterioration which would affect the structural integrity of the container, or severe corrosion will be transferred into overpacks, or containers in good condition, or the wastes may be transferred directly into tanks or treatment units. Open containers, improper storage in CMUs, and evidence of spills and leaks are among the focal points of inspections. Transporters of Hazardous Waste are required to meet the specifications in the USDOT regulations in 49 CFR Part 178 Subparts A through J, 49 CFR 173 Subparts J through O, and the requirements of 49 CFR 172.101 with respect to design and use of containers. Changes in these and other regulations brought about by USDOT's Performance Oriented Packaging Standards will be observed, by CHK or generators sending shipments of waste to CHK, as they are made effective.

Any containers found to be inadequately or improperly identified or deficient in the required information may be staged in a holding area until the deficiency can be resolved.

D-3e Response to Leaks: 40 CFR 264.171

Because the secondary containment system is designed to prevent storm water run-on, liquids found on the floor of a CMU will be either blown precipitation or leaks of stored materials. When an inspection reveals liquid within a contained area, the source will be identified if